

Amendments to the Drawings:

The attached replacement drawing sheets make changes to Figs. 3 and 4 and replace the original sheets with Figs. 3 and 4.

REMARKS

Claims 1-14 are pending in this application. By this Amendment, claim 1, the specification, the abstract and Figs. 3 and 4 are amended. Support for the amendments to claim 1 can be found in the specification as originally filed, for example, in the paragraph beginning at page 2, line 20 and at page 8, line 17; and in original claim 1. Support for the amendments to the specification, the abstract and Figs. 3 and 4 can be found in the specification as originally filed, for example, in the paragraphs beginning at page 2, line 6, page 2, line 36, page 9, line 1, page 9, line 30 and page 11, line 33, in the original abstract and in Figs. 3 and 4 as originally filed. No new matter is added by these amendments.

I. Objections

The Office Action objects to the drawings, abstract and disclosure for informalities therein. By this Amendment, Figs. 3 and 4 are amended to include the legend "Prior Art" and reference numeral "4," and the Abstract is amended to remove the word "comprising," as requested in the Office Action. In addition, the disclosure is amended to correct the informalities identified by the Office Action and by Applicants. In light of these amendments, reconsideration and withdrawal of the objections is respectfully requested.

II. Claim Rejections**A. Claims 1-14**

The Office Action rejects claims 1-14 under 35 U.S.C. §103(a) over the Specification at pages 1-4 and Figures 3 and 4, in view of U.S. Patent No. 3,937,011 to Caruel et al. Applicants respectfully traverse this rejection.

Independent claim 1 sets forth, in pertinent part, a "premixed air-fuel mixture supply device combined with a combustor liner included in a combustor, said premixed air-fuel mixture supply device comprising: a prevaporizing, premixing unit having inner and outer walls defining a prevaporizing, premixing chamber, the premixing chamber having a main

combustion air passage for a premixed air-fuel mixture and the main combustion air passage being located outside of a pilot combustion air passage for a pilot fuel; and a wall surrounding an end part of the outer wall so as to define a secondary combustion air passage together with the end part of the outer wall around the prevaporizing, premixing chamber; wherein a tail part of the outer wall is shaped in an atomization lip." Claims 2-14 depend from and include all of the limitations of claim 1. Such a premixed air-fuel mixture supply device is not taught or suggested by the cited art.

The specification is cited as allegedly disclosing, in the alleged admitted prior art, a premixed air-fuel mixture supply device combined with a combustion liner included in a combustor and including a prevaporizing premixing unit having inner and outer walls defining a prevaporizing premixing chamber substantially as claimed. The Office Action admits that the alleged admitted prior art does not disclose, on the tail part of the chamber outer wall, a secondary combustion air passage with an atomization lip and swirl device. To make up for this deficiency, the Office Action cites Caruel.

Caruel is directed to a fuel injector in which an annular intermediate flow containing fuel is sandwiched between an inner and an outer flow of air caused to rotate by swirl-promoting bladed devices called "swirlers," the inner flow being generated in a tubular duct which is closed at its upstream end with a bottom plate, and the "swirler" associated with said inner flow being a centripetal bladed device that opens to the tubular duct upstream of an annular duct supplied with fuel and itself opening at its downstream end to the tubular duct, thus forming a sharp enlargement within the tubular duct. Caruel at Abstract. Caruel is thus related to a diffusion combustion apparatus, and not to a prevaporized premixed air-fuel mixture combustion device, as claimed. As such, Caruel does not disclose, teach or suggest, and is entirely unrelated to, a prevaporizing, premixing chamber, a main combustion air

passage for a premixed air-fuel mixture, and a pilot combustion air passage for a pilot fuel, all as required in the claimed invention.

Although Caruel discloses a secondary air passage, that secondary air passage does not overcome the deficiencies of the alleged admitted prior art. The secondary combustion air passage (1 or 101) in Caruel is not for activating a prevaporized, premixed air-fuel mixture combustion. Instead, the secondary combustion air passage (1 or 101) in Caruel is for activating a diffusion combustion. This diffusion combustion of Caruel is a different burn-type from the burn-type of the claimed prevaporized, premixed air-fuel mixture combustion. The secondary air passage of Caruel is thus different from, and is used for a different purpose from, the claimed main combustion air passage for a premixed air-fuel mixture and a pilot combustion air passage for a pilot fuel, where the main combustion air passage is located outside of the pilot combustion air passage. For example, in the diffusion combustion of Caruel, a main combustion air passage and a pilot combustion air passage are not separated, and the main combustion air passage is not located outside of the pilot combustion air passage.

In contrast to Caruel, the claimed invention is directed to a premixed air-fuel mixture supply device utilizing prevaporized, premixed air-fuel mixture combustion. Important features, which are not taught or suggested by the alleged admitted prior art or Caruel, include that a wall surrounds an end part of the outer wall so as to define a secondary combustion air passage together with the end part of the outer wall around the prevaporizing, premixing chamber, and a tail part of the outer wall is shaped in an atomization lip. These features of the claimed invention help to solve the problem described at page 3, lines 19-33 of the specification, i.e., in the alleged admitted prior art, namely that when the combustor is in a low-load operation, the fuel injected by the premixed air-fuel mixture supply device is unable to vaporize in the prevaporizing, premixing chamber because the temperature of air around

the fuel is comparatively low and unvaporized fuel drops mixed in the swirling air are caused to adhere to a wall defining the prevaporizing, premixing chamber by centrifugal force. Thus, in the alleged admitted prior art, the fuel cannot be satisfactorily atomized and vaporized, and the quality of combustion in the combustion chamber is deteriorated.

Caruel does not teach or suggest this problem of the prior art, or a means for solving that problem. The secondary combustion air passage (1 or 101) in Caruel is not related to prevaporized premixed air-fuel mixture combustion, and thus Caruel's secondary combustion air passage does not solve the above problem. Because Caruel is related to a different combustion system, and does not appreciate the above problem, it would not have been obvious to one of ordinary skill in the art to substitute the secondary combustion air passage of Caruel into the alleged admitted prior art, and then modify the combination to practice the claimed invention.

For at least these reasons, any combination of the alleged admitted prior art and Caruel would not have rendered obvious the claimed invention. Claims 1-14 are thus patentable over the cited art. Reconsideration and withdrawal of the rejection are respectfully requested.

B. Claims 4 and 6

The Office Action rejects claims 4 and 6 under 35 U.S.C. §103(a) over the Specification at pages 1-4 and Figures 3 and 4, in view of Caruel, and further in view of U.S. Patent No. 3,974,646 to Markowski et al. Applicants respectfully traverse this rejection.

Claims 4 and 6 depend from and include all of the limitations of claim 1, which is set forth above. For all of the reasons described above, the combination of the alleged admitted prior art and Caruel does not teach or suggest all of the limitations of independent claim 1.

Markowski is cited for its alleged disclosures of an atomization lip that is sharp or has a thickness of 1 to 3 mm. However, regardless of the disclosure of Markowski, any

combination of Markowski with the alleged admitted prior art and Caruel still fails to teach or suggest all of the limitations of independent claim 1, from which claims 4 and 6 depend.

Markowski does not overcome the deficiencies of the alleged admitted prior art and Caruel, and thus a combination of the cited art would not have rendered obvious the claimed invention.

For at least these reasons, claims 4 and 6 are patentable over the cited art.


Reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachments:

Petition for Extension of Time
Amended Abstract
Replacement Drawing Sheets (2)

Date: February 27, 2006

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